

What is Claimed is:

1. A fabric composite resistant to an open flame comprising in order:

- 5 (a) sacrificial outer ticking,
(b) sacrificial cushioning material, and
(c) fire-blocking fabric,

the fire-blocking fabric being a single layer of nonwoven fabric comprising
10 at least 0.5 ounces per square yard (17 grams per square meter) of a
cellulose fiber that retains at least 10 percent of its fiber weight when
heated in air to 700 C at a rate of 20 degrees C per minute, and at least
0.5 ounces per square yard (17 grams per square meter) of a heat-
resistant fiber.

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2. The fabric composite of claim 1 wherein the outer ticking is a
woven or knitted fabric having a basis weight of from 2 to 8 ounces per
square yard (67 to 271 grams per meter).

20 3. The fabric composite of claim 1 wherein the cushioning
material comprises a layer of fibers or a layer of foam or a combination of
fiber and foam layers.

4. The fabric composite of claim 3 wherein the outer ticking and
25 cushioning material are present in an amount that it has a total heat of
combustion of from 5 to 130 megajoules per square yard (6 to 155
megajoules per square meter)

5. The fabric composite of claim 4 wherein the outer ticking and
30 cushioning material have a total heat of combustion of less than 75
megajoules per square yard (90 megajoules per square meter).

6. The fabric composite of claim 5 wherein the outer ticking and cushioning material have a total heat of combustion of less than 30 megajoules per square yard (36 megajoules per square meter).

5 7. The fabric composite of claim 3 wherein the layer of fibers in the cushioning material is a batting of fibers, a vertically pleated arrangement of fibers, or a network of fibers.

8. The fabric composite of claim 3 wherein the cushioning
10 material has a minimum thickness of at least ¼ inch (0.6 cm) and a maximum thickness of 3 inches (7.6 cm).

9. The fabric composite of claim 1 wherein the heat resistant fiber is an organic fiber that retains 90 percent of its fiber weight when
15 heated in air to 500 C at a rate of 20 degrees C per minute.

10. The fabric composite of claim 1 wherein the heat-resistant fiber comprises a para-aramid, polybenzazole, polybenzimidazole, or polyimide polymer.

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11. The fabric composite of claim 10 wherein the para-aramid is poly(paraphenylene terephthalamide).

12. The fabric composite of claim 1 wherein the cellulose fiber is
25 a viscose fiber containing silicic acid.

13. The fabric composite of claim 12 wherein the heat resistant fiber is a poly(paraphenylene terephthalamide) fiber and the viscose fiber (X) and heat resistant fiber (Y) being present in the fire-blocking fabric in a
30 weight ratio expressed by the equation

$$Y \geq -0.14X + 1.3$$

14. The fabric composite of claim 1 wherein the fire-blocking fabric further comprises an off gassing material that releases a flame suppressing gas when burned.

5 15. The fabric composite of claim 14 wherein the off gassing material is a modacrylic fiber.

16. The fabric composite of claim 14 wherein the off gassing material is a polyvinylchloride fiber.

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17. A mattress resistant to an open flame comprising the fabric composite of claim 1.

15 18. The mattress of claim 17 wherein the fabric composite is located in a panel of the mattress.

19. The mattress of claim 17 wherein the fabric composite is located in a border of the mattress.

20 20. The mattress of claim 17 wherein the fabric composite further comprises seams having fire resistant thread stitching.

21. A mattress resistant to an open flame comprising the fabric composite of claim 9.

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22. The mattress of claim 21 wherein the fabric composite is located in a panel of the mattress.

30 23. The mattress of claim 21 wherein the fabric composite is located in a border of the mattress.

24. The mattress of claim 21 wherein the fabric composite further comprises seams having fire resistant thread stitching.

25. A mattress resistant to open flame comprising the fabric composite of claim 13.

26. A mattress set resistance to an open flame comprising a mattress and a mattress foundation, said mattress set comprising the fabric composite of claim 1.

27. A mattress set resistance to an open flame comprising a mattress and a mattress foundation, said mattress set comprising the fabric composite of claim 9.

28. A mattress set resistance to an open flame comprising a mattress and a mattress foundation, said mattress set comprising the fabric composite of claim 13.

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29. A mattress set resistant to an open flame comprising a mattress and a mattress foundation:

the mattress comprising a fabric composite and a mattress core, the fabric composite comprising in order:

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- (a) sacrificial outer ticking,
- (b) sacrificial cushioning material, and
- (c) a single layer nonwoven fire-blocking fabric,

the mattress foundation comprising a single layer nonwoven fire-blocking fabric and a support structure,

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wherein the mattress set has a peak heat release rate of less than 150 kilowatts within 30 minutes and a total heat release of less than 25 megajoules in the first 10 minutes when tested according to Technical Bulletin 603 of the State of California.

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30. The mattress set of claim 26 wherein the single layer nonwoven fire-blocking fabric comprises at least 0.5 ounces per square yard (17 grams per square meter) of a heat resistant fiber, the nonwoven fabric having a basis weight of at least 2.5 ounces per square yard (85 grams per square meter)

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31. The mattress set of claim 27 wherein the heat resistant fiber

5 32. The mattress set of claim 27 wherein the heat resistant fiber

33. The mattress set of claim 27 wherein the heat resistant fiber

15 $Y \geq -0.14X + 1.3$.

34. The mattress set of claim 18 wherein the mattress set has a

35. The mattress set of claim 31 wherein the single layer

36. The mattress set of claim 32 wherein the heat resistant fiber

37. The mattress set of claim 32 wherein the heat resistant fiber

38. The mattress set of claim 32 wherein the heat resistant fiber is a poly(paraphenylene terephthalamide) fiber and the nonwoven fire-blocking layer includes a viscose fiber containing silicic acid, the viscose fiber (X) and heat resistant fiber (Y) being present in the fire-blocking fabric in a weight ratio expressed by the equation

$$Y \geq -0.14X + 1.4$$

39. A process for fire-blocking a mattress while retaining the aesthetics of the mattress cushioning material, the mattress having, in order, ticking, cushioning material, and a mattress core, the process comprising:

- (a) incorporating into the mattress a fire-blocking fabric between the cushioning material and the mattress core,
- (b) the fire-blocking fabric being a single layer of nonwoven fabric comprising at least 0.5 ounce per square yard (17 grams per square meter) of a cellulose fiber that retains at least 10 percent of its fiber weight when heated in air to 700 C at a rate of 20 degrees C per minute and at least 0.5 ounces per square yard (17 grams per square meter) of a heat-resistant fiber.

40. The process of claim 34 wherein the heat resistant fiber is an organic fiber that retains 90 percent of its fiber weight when heated in air to 500 C at a rate of 20 degrees C per minute.

41. The process of claim 34 wherein the heat-resistant fiber comprises a polymer selected from the group of para-aramid, polybenzazole, polybenzimidazole, and polyimide.

42. The process of claim 36 wherein the para-aramid is poly(paraphenylene terephthalamide).

43. The process of claim 34 wherein the heat resistant fiber is a poly(paraphenylene terephthalamide) fiber and the cellulose fiber is a viscose fiber containing silicic acid, the viscose fiber (X) and poly(paraphenylene terephthalamide) fiber (Y) being present in the fire-
5 blocking fabric in a weight ratio expressed by the equation

$$Y \geq -0.14X + 1.4$$

44. The process of claim 34 wherein the fire-blocking fabric
10 further comprises an off gassing material that releases a flame suppressing gas when burned.